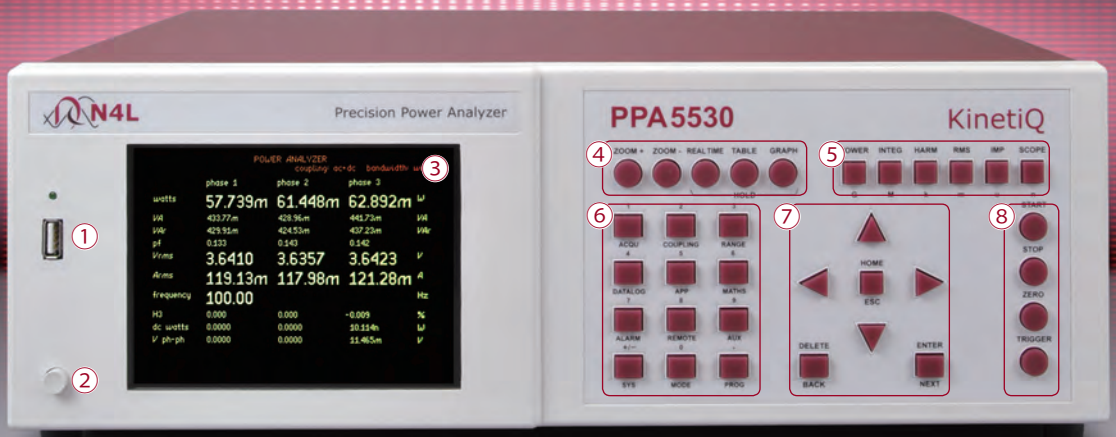
Precision Power Analyzers

PPA5500 Series
PPA1500 Series
PPA500 Series

Leading wideband accuracy	Basic 0.01% with class leading high frequency performance
Wide frequency range	DC, 10mHz to 2MHz - PPA5500 / DC, 10mHz to 1MHz - PPA1500 / DC, 10mHz to 500kHz - PPA500
Fast sample rate and No-Gap	2.2M samples/s - PPA5500 / 1M samples/s - PPA1500/500, High accuracy in noisy applications
Leading phase accuracy	0.005 Degrees plus 0.01 degrees per kHz
Built in high precision current shunt	10Arms, 30Arms or 50Arms with up to 1000Apk direct plus a wide range of external sensors
Versatile interfaces	RS232, USB, LAN, GPIB (PPA5500) plus direct torque and speed (PPA5500)
Range of PC software options	Remote control, monitoring and recording of real time data, tables and graphs

PPA5530 Precision Power Analyzer

FRONT VIEW



① FRONT USB PORT

USB memory port allows data or screendumps to be saved directly to a USB pen drive

② POWER BUTTON

③ DISPLAY SCREEN

White LED backlight colour TFT display with high contrast and wide viewing angle

④ SCREEN DISPLAY OPTIONS

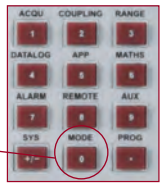
Zoom, Real time, Table and Graph options

⑤ MEASUREMENT FUNCTION SELECTION BUTTONS

- POWER ANALYZER
- POWER INTEGRATOR
- HARMONIC ANALYZER
- TRUE RMS VOLTMETER and AMMETER
- IMPEDANCE METER
- OSCILLOSCOPE

PPA5500 SERIES

PPA1500 SERIES



⑥ MEASUREMENT SETTINGS BUTTONS

PPA500 SERIES

Acquisition settings - Sets wiring configuration,

Smoothing and data logging

Coupling - Set coupling to AC, DC or AC+DC, also set bandwidth

Range - Internal or external attenuator, autoranging settings, scale factors

Application mode - PWM, ballast, inrush current, power transformer, standby power

Plus direct configuration of - Alarm, Auxiliary, Remote, System and Program functions

⑦ MENU SELECTION AND CURSOR CONTROL

⑧ START, STOP, ZERO AND TRIGGER

Trigger button refreshes measurement, Zero resets datalog or allows an offset trim

Start and Stop buttons provide manual control of a measurement period

REAR VIEW

PPA5530 (3 Phase)

⑨ PHASE INPUTS

Direct voltage Input: 3kVpk (1kVrms) in 9 ranges

Direct current Input: 300Apk (30Arms) Standard Model, 30Apk (10Arms) Low Current Model, 1000Apk (50Arms) High Current Model

External voltage and current sensor inputs to 3Vpk in 9 ranges - BNC Connector

PPA1500/500: 300Apk (20Arms) direct current input, PPA1500/500-HC: 1000Apk (30Arms)

⑩ SYNC CONNECTOR

All PPA models can offer up to 9 phase analysis using the PPALoG PC program Additionally two PPA5530's can be connected via the extension port and sync BNC connector to form a 6 phase analyzer when a PC is not available (PPA5500 only)

⑪ EXTERNAL SENSOR INPUTS

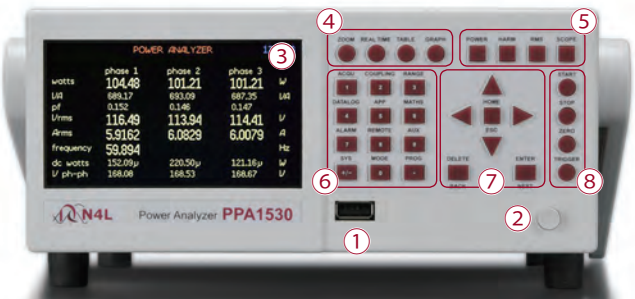
+/-10V or pulsed input from torque and speed sensors provides direct measurement of mechanical power + Analogue output (PPA5500 only)

⑫ PC INTERFACE CONNECTIONS

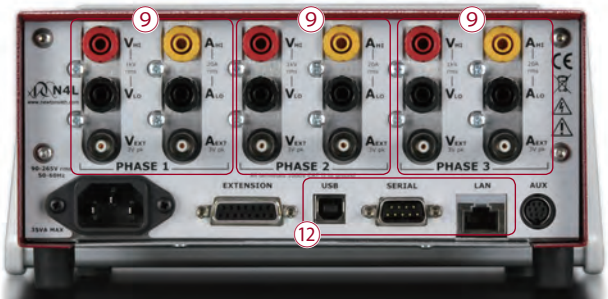
Standard interfaces RS232 + USB + LAN (Optional) + GPIB (Optional on PPA5500 only)

⑬ LOW NOISE EFFICIENT FANS

Air bearing low noise fans are utilized to ensure minimum audible and electrical noise while maintaining a stable operating temperature for the high precision low inductance internal current shunts



PPA1530 (3 Phase)

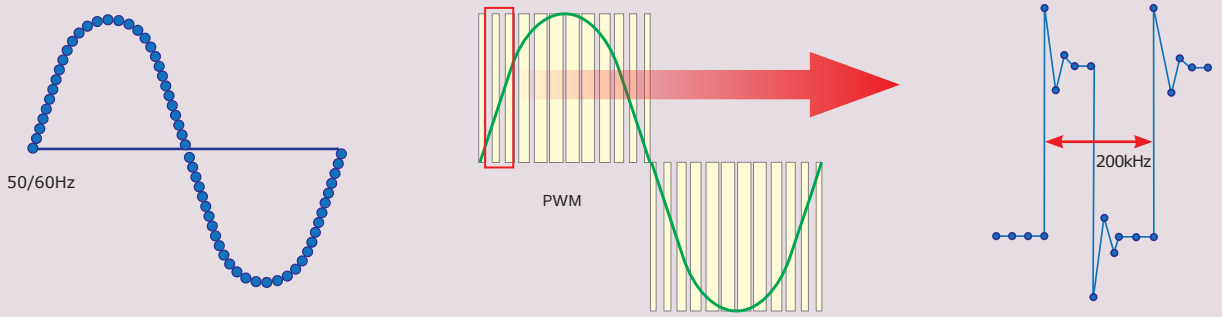


PPA530/1530 (3 Phase)

■ High Speed Power Measurement PPA5500

Measurements include all frequency components in power waveforms for example, fundamental, harmonics of the fundamental and the carrier of a PWM inverter output by maintaining 2.2Ms/s sampling at any drive frequency

※PPA1500/PPA500 sample rate 1MS/s



High sample rate at all times

Unique FPGA and DSP architecture permits full 2.2Ms/s sample rate at any fundamental frequency

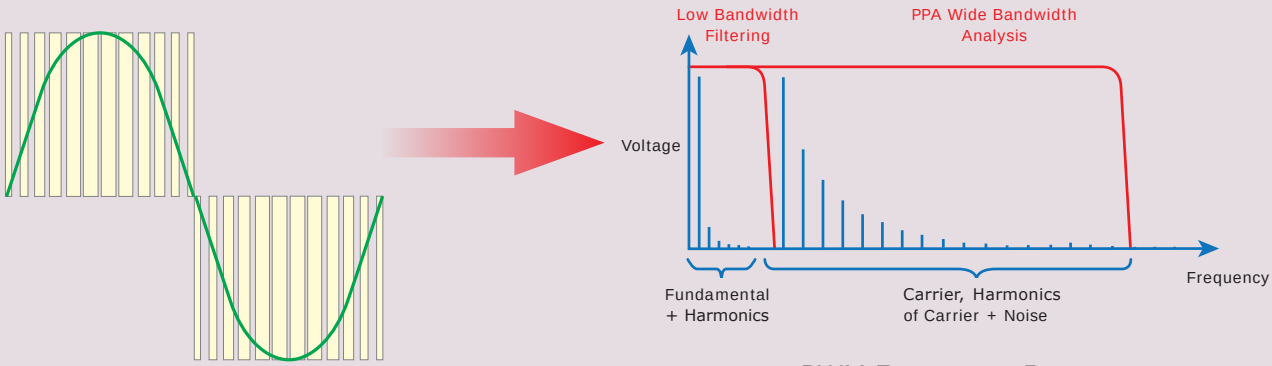
Inverter output waveform

PWM carrier signal

Fast sampling reliably captures fast switching waveforms

■ 2MHz Wideband Frequency Response PPA5500

With 2MHz bandwidth and exceptionally flat response, the PPA provides precision analysis of total power in applications such as lighting ballasts or PWM drives that involve a wide range of frequency components. Proprietary to N4L, a digital process called Expanded Nyquist Sampling ensures no alias components



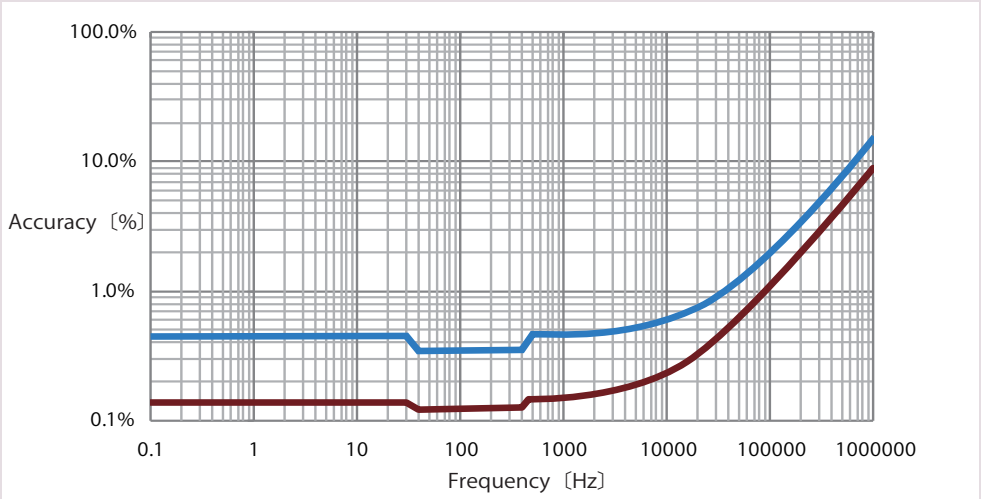
PWM Frequency Range

■ High Accuracy PPA5500 PPA1500 PPA500

Unique voltage and current analogue card design ensures high accuracy for both power and harmonic analysis

Class Leading
Power Accuracy

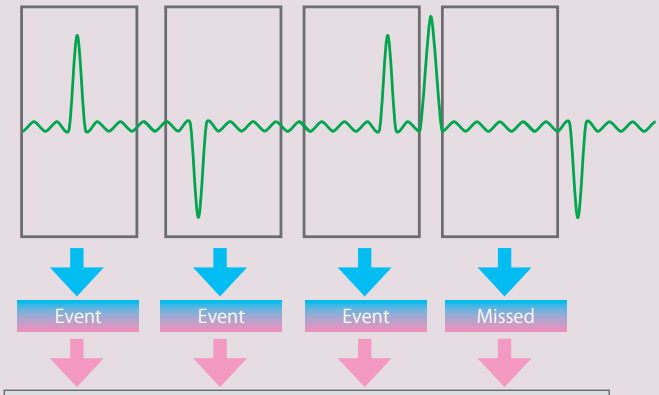
Power Accuracy: [0.03% + 0.03%/pf + (0.01% x kHz)/pf] Rdg + 0.03%VA Rng
240V (300V Range), 1A (3A Range), Power Factor : 1 (40-400Hz 0.02%VA Rng)



■ DFT Real Time No Gap Analysis PPA5500 PPA1500 PPA500

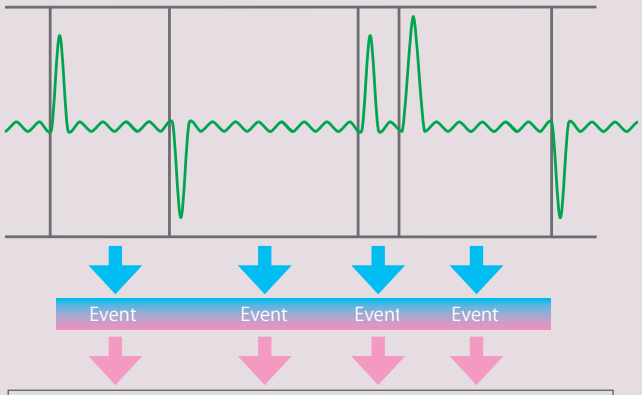
Many power applications have fast changing asynchronous current pulses which are not suited to fixed data length FFT analysis. The PPA series combine a real time DFT (Discrete Fourier Transform) technique with variable window no gap analysis to ensure the optimum speed and accuracy at all times

Low Duty Cycle Standby Current



Gapped analysis causes events to be missed, resulting in inaccurate measurements

PPA Series IEC62301 Testing



FPGA/DSP Real time measurement with no gap

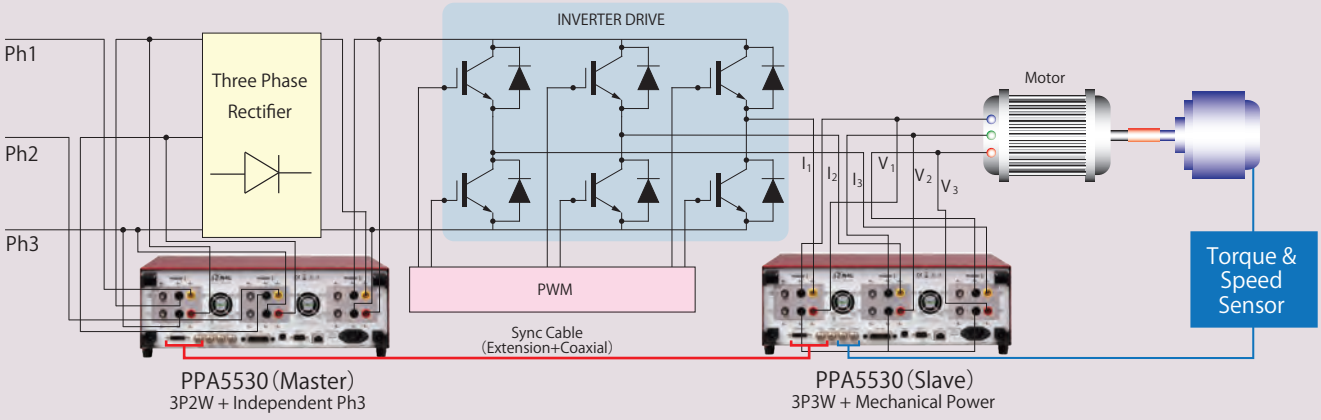
- Missing data compromises power accuracy
- Long term measurement integration achieves approximately correct average power

- Real Time No Gap analysis ensures correct power measurement
- Simultaneous fundamental and pulse frequency synchronization quickly obtains the correct power

■ Up to 6 Phase Analysis PPA5500

Master/Slave mode enables two PPA5530's to be fully synchronized into a single 6 phase measurement system

※4 or more phase measurements provided via N4L PC software or master slave mode



3Ph Input DC Bus 3Ph PWM Output Mechanical Power

Advantages of Dual PPA vs Single instrument

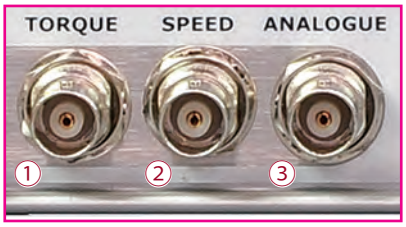
- Twice the processing power as one unit
- Flexibility between different applications
- Units fully synchronized giving single point of control

Measurement parameter examples

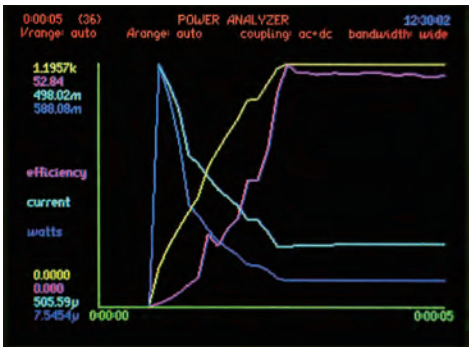
- Input/Output power measurement
- Efficiency of the inverter
- Inverter output voltage harmonics
- Motor drive characteristics

Input Torque and Speed Sensor PPA5500

Direct measurement of torque and speed from dedicated inputs that are fully synchronized with the voltage and current channels permits true real time power conversion efficiency to be evaluated



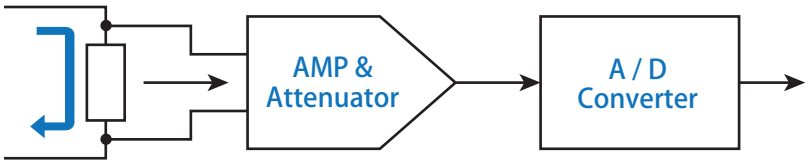
①TORQUE Bipolar±10V / pulsed
②SPEED Bipolar±10V / pulsed
③ANALOGUE Analogue output of selected function ±10V



Graph

Real time data

Built in Amplifier and Unique Shunt Resistor PPA5500 PPA1500 PPA500



The PPA series use a single shunt resistor unique to N4L that combines exceptional linearity and no need for relay switching which can cause measurement errors

Model	Low Current Model	Standard Model	High Current Model
PPA5500	9 ranges: 3mApk - 30Apk (10Arms) 100mΩ Shunt	9 ranges: 30mApk - 300Apk (30Arms) 10mΩ Shunt	9 ranges: 100mApk - 1000Apk (50Arms) 3 mΩ Shunt
PPA1500/ PPA500	–	8 ranges: 100mApk - 300Apk (20Arms) 10mΩ Shunt	8 ranges: 300mApk - 1000Apk (30Arms) 3mΩ Shunt
		x10 Mode - 10mApk - 30Apk	x10 Mode - 30mApk - 100Apk

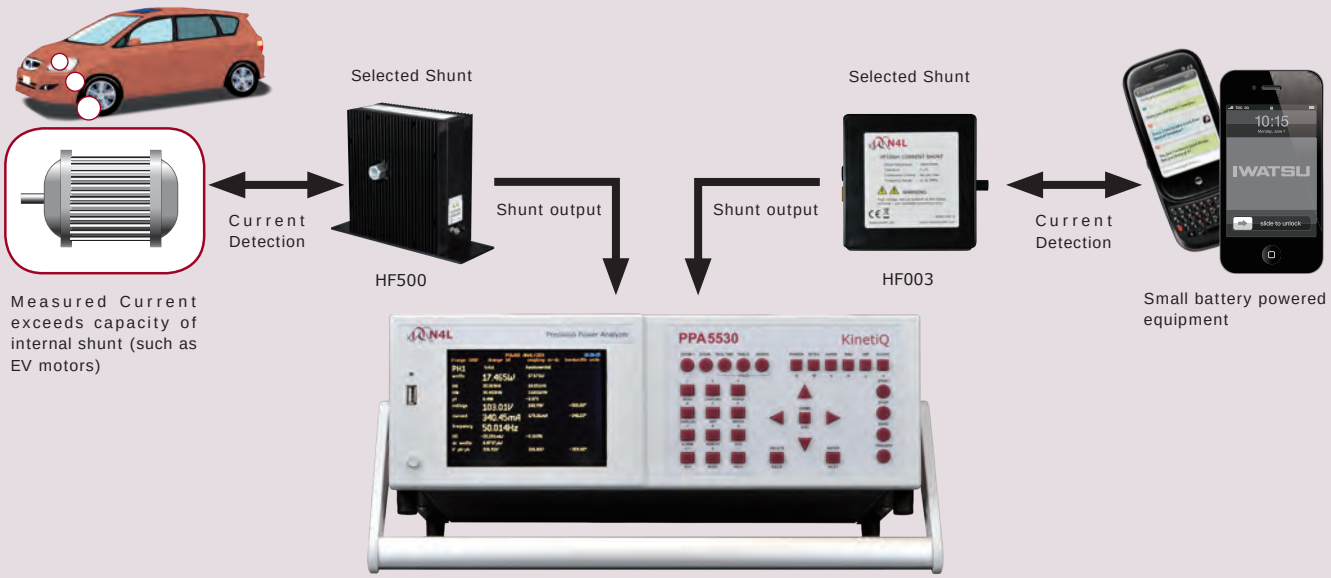
External shunt options

(DC ～ 1MHz, 0.1% Accuracy, Inductance<1nH)

Model	Maximum Current		Bandwidth
	Rated A	Peak	
HF500	500Arms	5000Apk	DC ～ 1MHz
HF200	200Arms	2000Apk	
HF100	100Arms	1000Apk	
HF020	20Arms	200Apk	
HF006	6Arms	60Apk	
HF003	3Arms	30Apk	

HF003

HF500

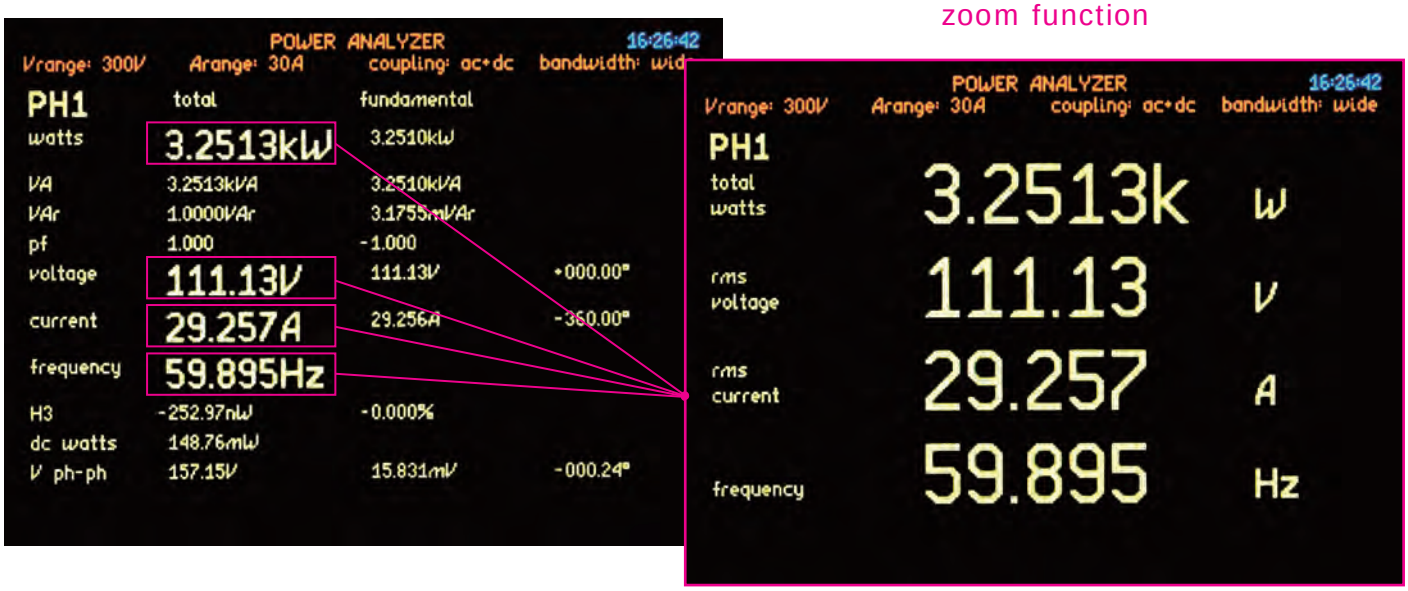


Utilising external shunt resistors

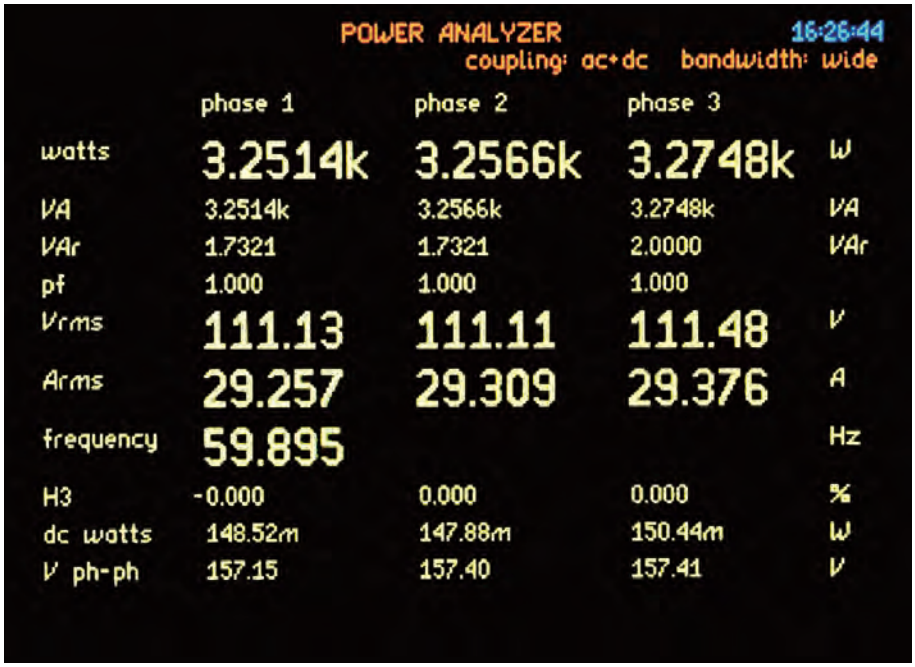
MEASUREMENT DISPLAY

Power Analysis PPA5500 PPA1500 PPA500

Any parameters can be enlarged with the zoom function



Zoom function enabled on total watts, rms voltage, rms current and frequency



3 Phase analysis display selectable in both Total and Fundamental values

All power measurement and RMS values are computed simultaneously allowing measured values to be selected and viewed during analysis

Here, three phase total power is selected with all primary power functions in each phase plus frequency, a selected harmonic, dc watts and phase to phase voltage

Mechanical power, Maths and Efficiency functions can also be added to this screen giving real time analysis of electrical or electrical to mechanical systems

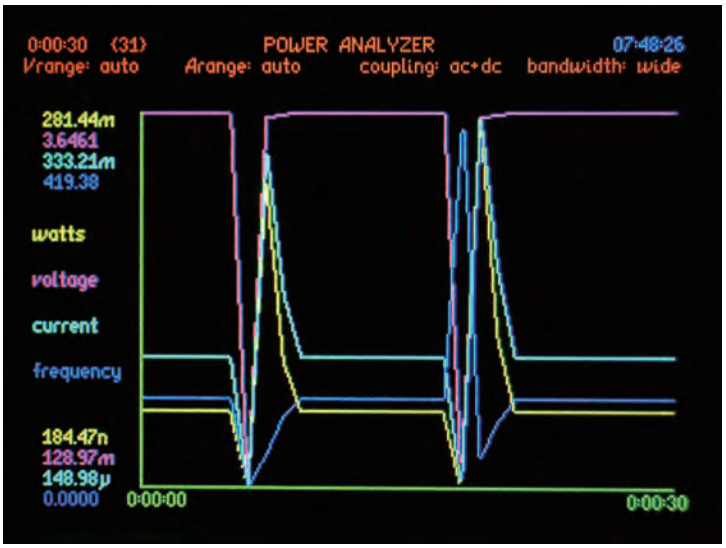
MEMORY

Large 1GB (PPA5500 series) internal memory, data logging from 10ms intervals with synchronization to the fundamental frequency and no gap between measurements

Datapoint storage up to 10M in the PPA5500 series and 16k in the PPA1500/500 series

Alternatively the data can be stored in an external USB pen drive or directly to PPALoG PC software

Voltage, Current, Frequency and Power - Examples of graph mode

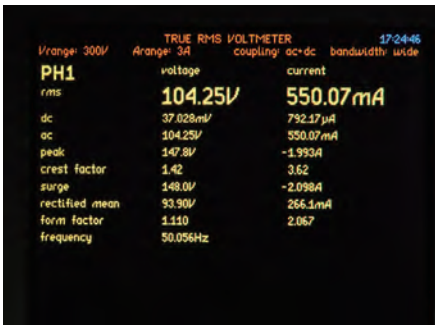


Trend analysis *No Graph function in PPA500

Power Integrator (power consumption) Mode, RMS Meter Mode and Impedance Meter Mode PPA5500 PPA1500 PPA500

POWER INTEGRATOR
coupling: ac+dc bandwidth: wide
phase 1 phase 2 phase 3
W hours 2.9979m 3.1055m 3.3086m Wh
VA hours 15.790m 15.862m 16.477m VAh
VAr hours 15.460m 15.516m 16.095m VArh
pf avrg 0.190 0.196 0.201
V avrg 3.5951 3.5885 3.5975 V
A hours 4.3919m 4.4203m 4.5803m Ah

Power Integrator mode



RMS Voltmeter mode

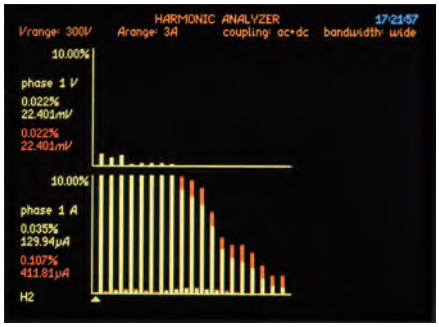
IMPEDANCE METER
coupling: ac+dc bandwidth: wide
phase 1 phase 2 phase 3
impedance 343.9 108.9k 92.22 Ω
resistance 334.8 108.9k -84.31 Ω
reactance -78.54 -25.49 +37.37 Ω
phase -013.20 -000.01 -203.90 °
frequency 49.984 49.991 1.7870M Hz

Impedance meter mode

Note

In addition to detailed measurements of the phase power parameters, you can check the balance of power between the phases and observe computed neutral current when 3 phase 4 wire connection is selected

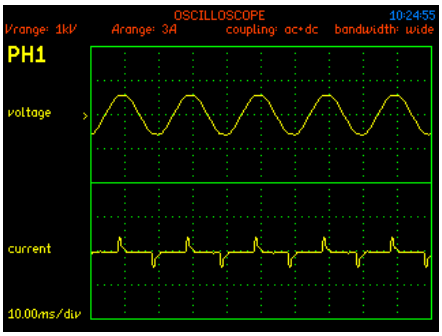
Harmonic Analyzer and Oscilloscope PPA5500 PPA1500

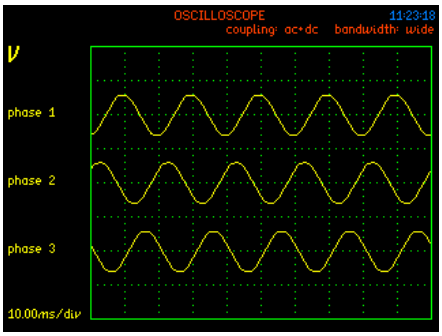


Harmonic analyzer (Bar graph)
*No Graph function in PPA500

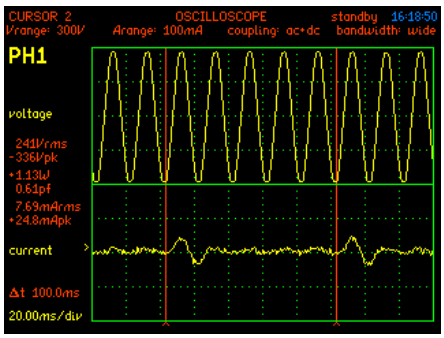
Harmonic analyzer summary page

Harmonic analyzer table

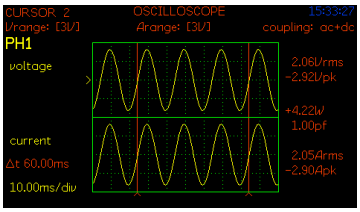




Oscillosope - Voltage and Current display, Phase 1,2 and 3
*No Scope function in PPA500



PPA55xx



PPA15xx

Oscillosope Cursors - Enable cursors and display Vrms, Vpk, Watts, Power Factor, Arms and Apk (Not PPA500)

Note

In Harmonic Analyzer Mode, the PPA1500/PPA500 provides up to 50 Harmonics with real time, table or bar graph presentation(*No Graph presentation in PPA500). Measurements are in absolute magnitude and percentage of fundamental with harmonic phase also available. The PPA5500 extends the harmonic range to 417 for aerospace applications and also includes an FFT spectrum mode for interharmonic analysis (Available instead of IEC61000)

ACQUISITION SETTINGS

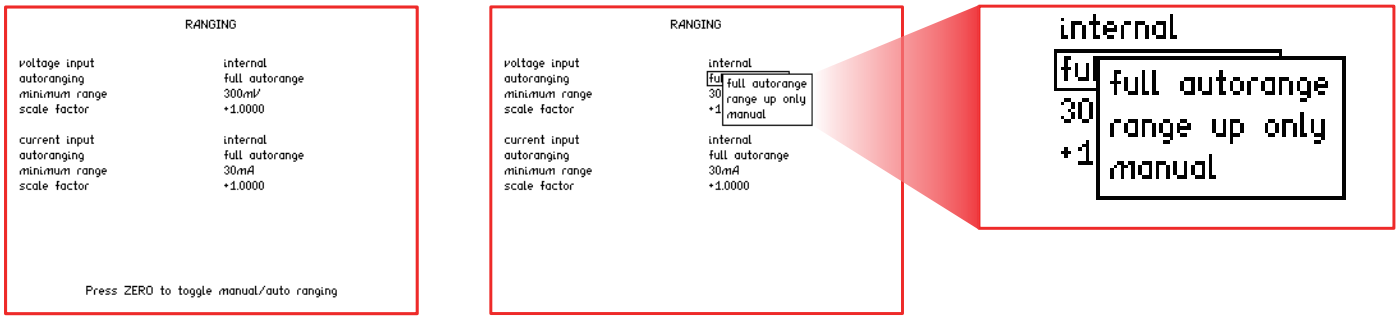
Auto-Ranging, Range Up Only or Manual PPA5500 PPA1500 PPA500

Range modes are selectable

①Auto-Ranging Performs automatic switching of voltage and current ranges up and down depending on the level of the measured value with all inputs linked or ranged independently to ensure optimum accuracy

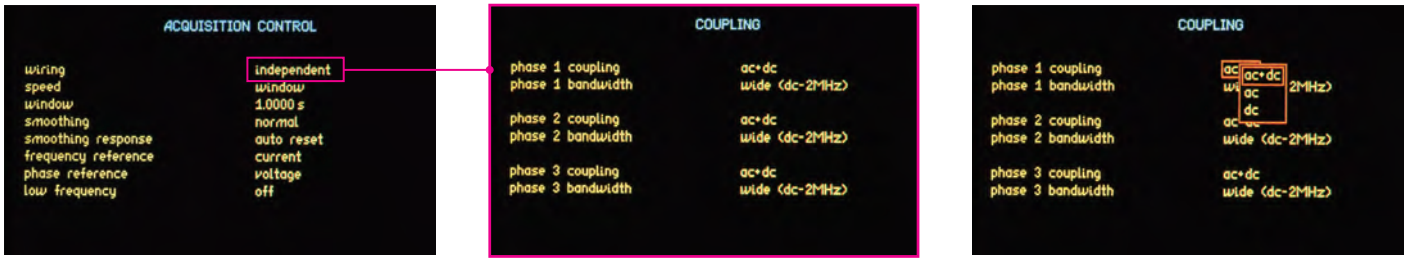
②Range up only Performs automatic ranging when the input is 120% of range, ranging up only

③Manual No automatic ranging, user specifies the range in which to operate
(Used when input voltages and currents are known) or during inrush current testing

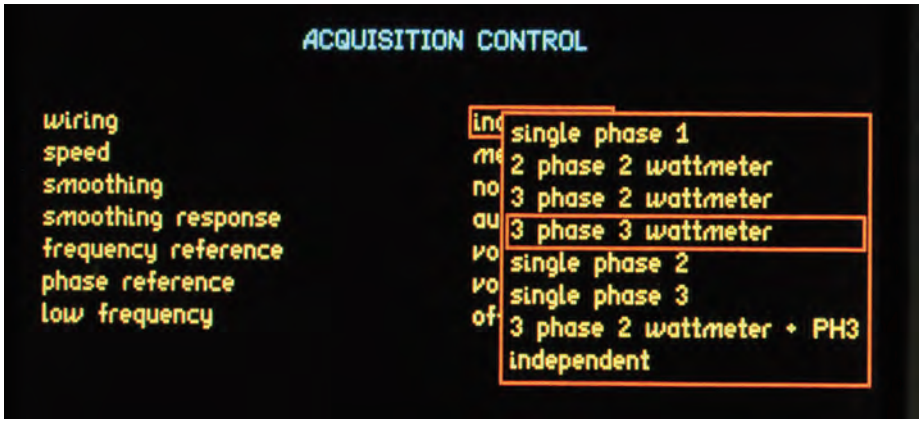


Independently Set Input Coupling PPA5500

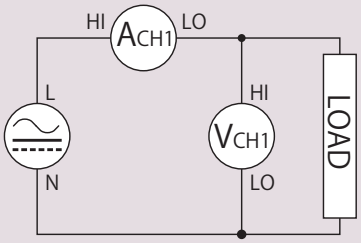
Independently set input coupling so different methods of sensing can be implemented. Such as a CT on phase 1 and shunt sensing on phases 2 + 3



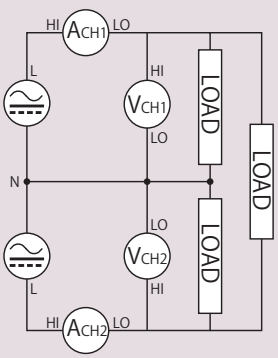
Wiring Settings PPA5500 PPA1500 PPA500



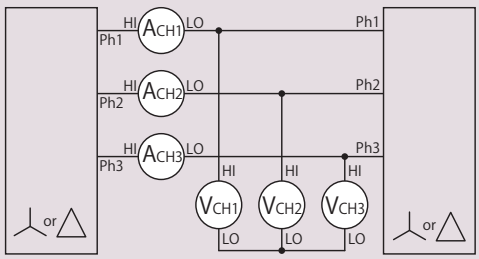
Various wiring arrangement settings to satisfy a complete range of setups found in power analysis, fully independent mode in PPA5500 only.



1 Phase 1 Wattmeter



2 Phase 2 Wattmeter



3-phase 3 Wattmeter(Reference to neutral)

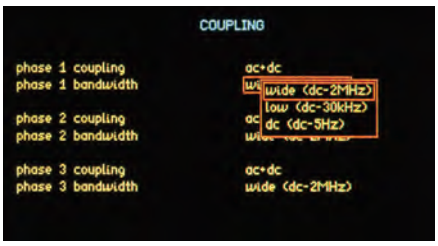
ACQUISITION SETTINGS

Bandwidth Settings PPA5500

DC(DC-5Hz) DC measurements up to 5Hz

Low(DC-200kHz) Basic power (50/60Hz) including harmonics of the fundamental while rejecting high frequency noise

Wide(DC-2MHz) Wideband applications such as PWM inverter drives including all power components for true total power



Example of independent wiring configuration showing 3 phase individual coupling settings

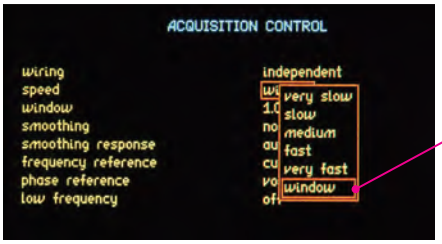
Note

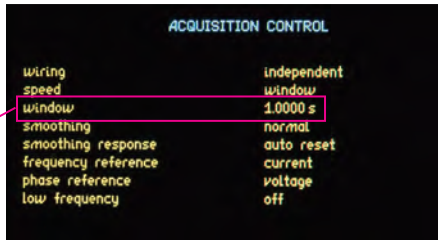
The PPA5500 series includes a programmable digital filter that allows users to set a preferred bandwidth

Display Settings, Smoothing Response and Frequency Reference PPA5500 PPA1500 PPA500

①Display update rate

Various settings for the display update rate (12.5ms ～ 10s) which also increases the smoothing when used together with the smoothing option. A 'window' option permits direct control of the measurement window size

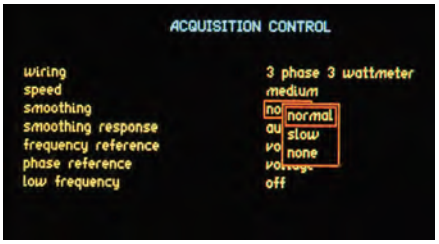




Example of setting the window, eg (50Hz set to 20ms)

②Smoothing settings

Working in conjunction with the speed setting, a smoothing filter can then be applied to the measurements. Normal and slow options are available which apply an increasing time constant to the output of the measurement window

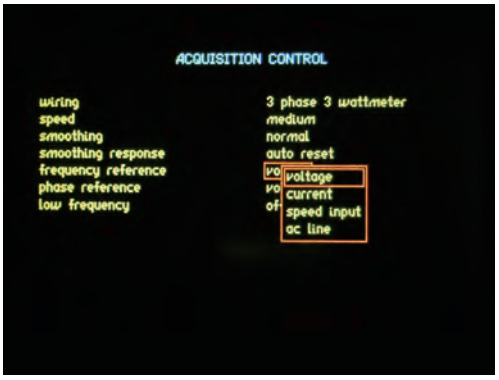


speed	update rate	normal time constant	slow time constant
Very Fast	1/80s	0.05s	0.2s
fast	1/20s	0.2s	0.8s
medium	1/3s	1.5s	6s
slow	2.5s	12s	48s
very slow	10s	48s	192s

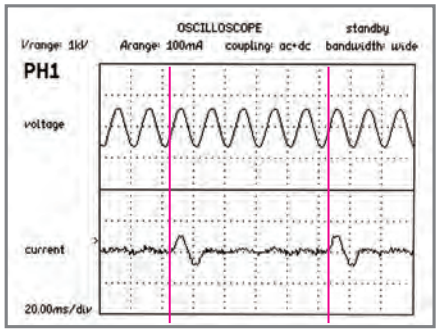
・Display update speed settings
・Setting the filter (normal/slow)

Frequency Reference PPA5500 PPA1500 PPA500

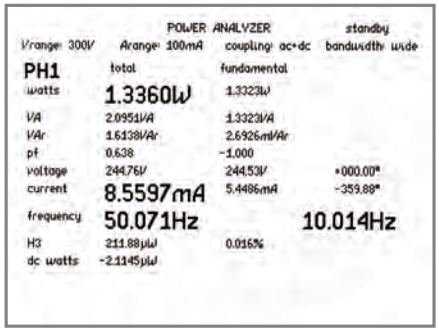
When making a precision measurement of ac power, correct synchronization with the fundamental frequency is essential. The PPA series provides a solution to frequency synchronization in a wide range of applications including Standby Power, Variable Speed Drives, Electronic Ballasts and DC to AC Inverters with the option to select voltage, current, speed or ac line input as the frequency reference. The PPA5500 series also provides fully independent frequency detection an all phase inputs



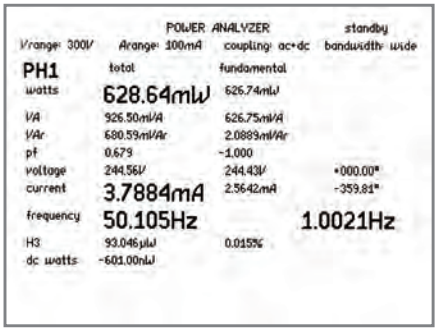
Speed Input PPA5500 only



1:5 cycle (10Hz standby current period)
Power measurements synchronized to low duty cycle current pulses of a power supply in standy mode



1:5 duty cycle standby power measurement cycle

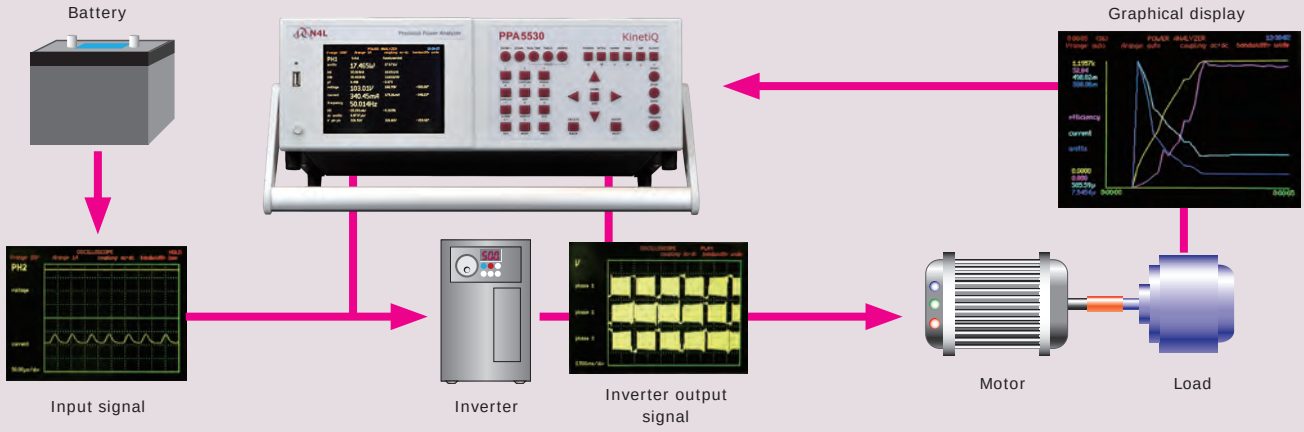


1:50 low duty cycle (1Hz) power measurement

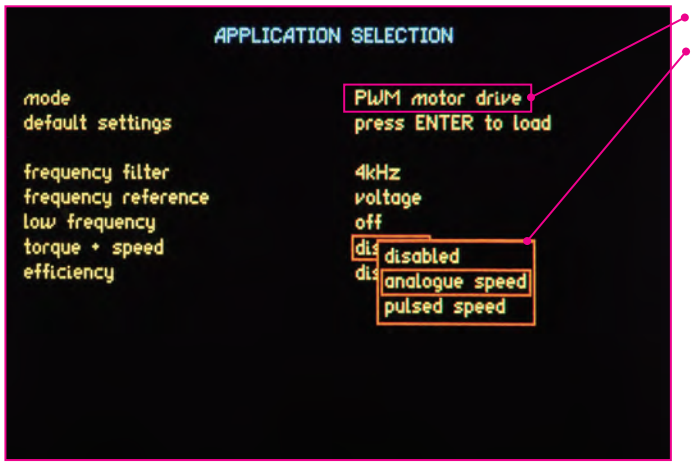
Application Modes PPA5500 PPA1500 PPA500

In addition to the usual power measurements, various modes are pre programmed into the instrument including "PWM motor drive*", "ballast lighting system", "inrush current", "power transformer*" and "standby power"

*PPA5500 only

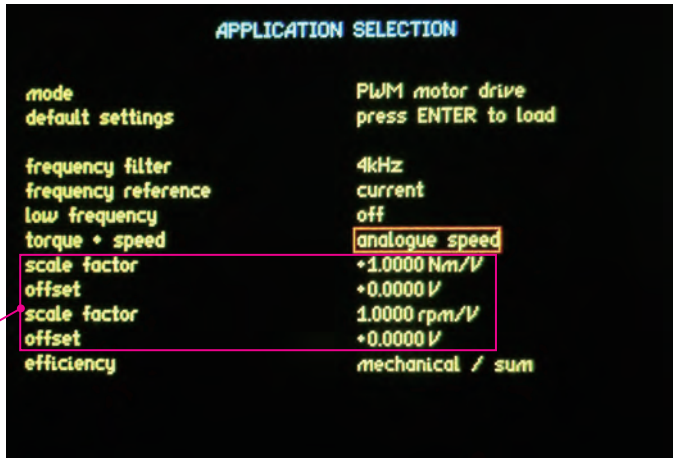


Example setup when measuring inverter output with respect to load



Mode Selection

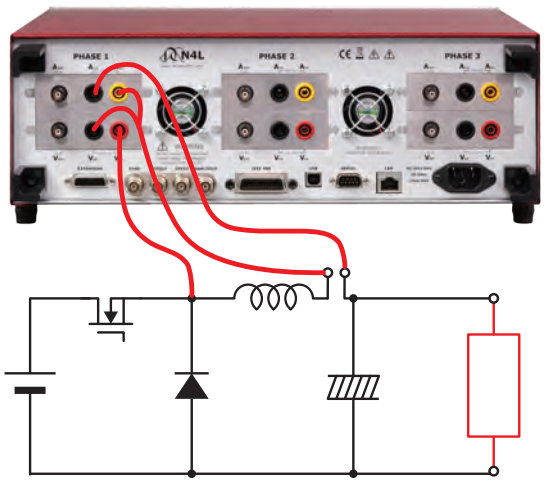
PWM torque and speed sensor selection



Scale factor of analogue speed and torque inputs

Inductance Loss Analysis PPA5500 PPA1500 PPA500

An example of analysis of dynamic inductance losses



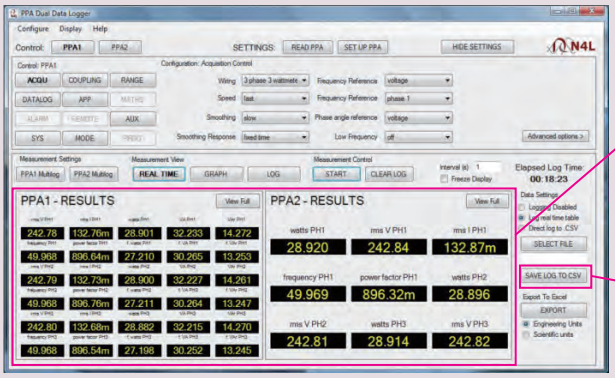
Real time data

PC CONTROL AND DATA ACQUISITION

PC Software PPA5500 PPA1500 PPA500

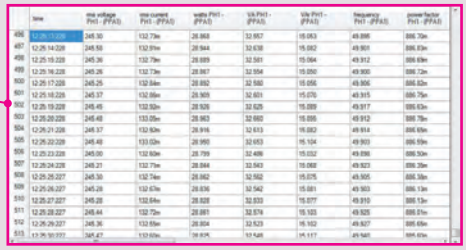
Analysis carried out by the instrument can easily be transferred to a PC via USB, RS232 or LAN

① PPALoG Exceptional flexibility and ease of use with all the primary functions PPAcomm had plus master/slave mode for 4-9 phase applications and data/image export to Text file, Excel, Bitmap or Clipboard



a. Measurement parameters are chosen by the user from tick box options
b. Real time results can be displayed as latest value, table or graph
c. Datalogging results are then saved in the selected format

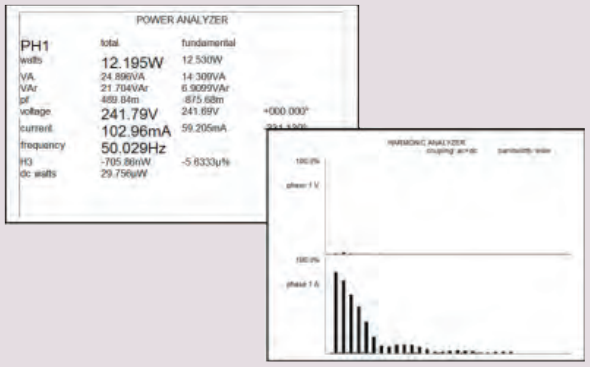
Simultaneous display of master and slave units



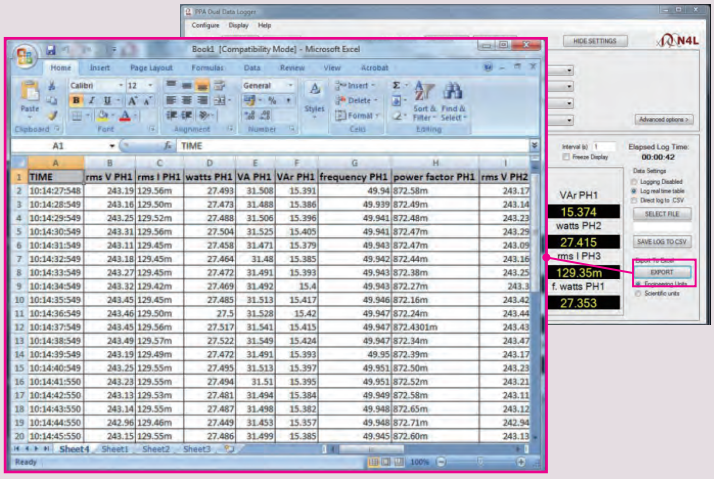
Real time Datalog

Capture up to 60 measured functions per line

Data Export options

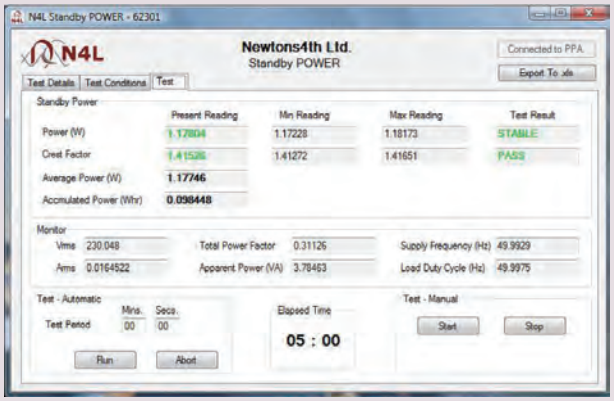


A Bitmap image of any PPA screen image can be copied to clipboard or imported directly into documents



Measurement tables generated by the data logging function can be exported directly to Excel

② PPA Standby Power Full compliance testing to IEC62301. Meets or exceeds the requirements and methodology of U.S. EPA (Energy Star), U.S.DOE, California Energy Commission (CEC), among others.

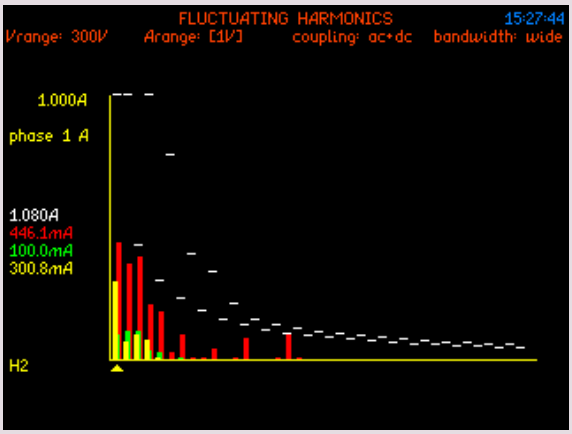


Standby power test screen with real time update of IEC62301 criteria

On completion of the standby test, a full test report can be exported directly to a spreadsheet

■ Fully Compliant IEC61000-3-2/3-3 Harmonics and Flicker Testing PPA5500

The PPA55xx series Power Analyzers provide fully compliant Harmonics and Flicker testing, Newtons4th offer the ability to display the results of any test within the instrument or to PC software.



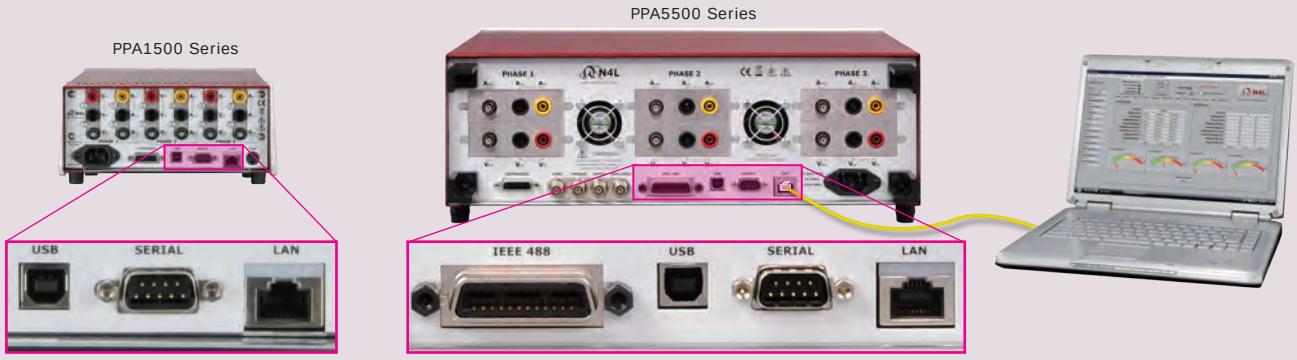
Limits are shown in the graph mode where current, average and max values are updated. The class of the device under test (Harmonics) can be selected in the application menu.

After the test is complete, the unit will display a Pass or Fail message. A screen shot can be downloaded to software, alternatively the test can be controlled and monitored in software.

More information is available in a separate IEC61000 Harmonics and Flicker brochure, fully compliant models are PPA5511 and PPA5531 see ** on page 14 for spec

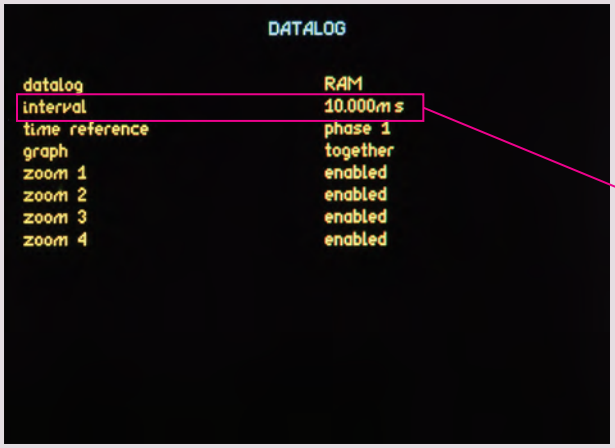
■ Connection Interface PPA5500 PPA1500 PPA500

RS232 (standard), USB (standard), LAN (optional), GPIB (option for PPA5500 series)

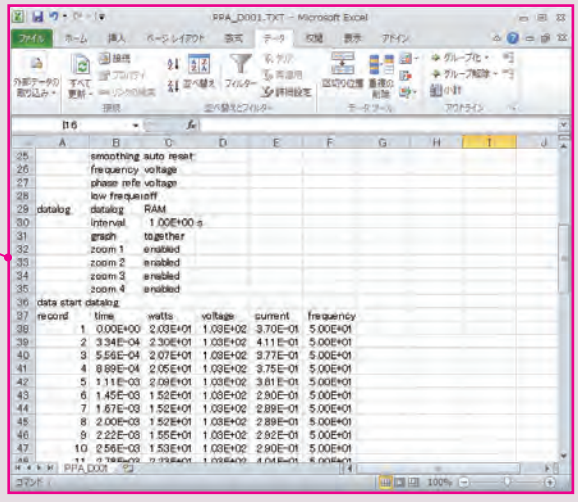


■ Data Logging PPA5500 PPA1500 PPA500

Utilizing sophisticated frequency detection techniques, synchronization with the fundamental AC waveform is automatically achieved. Datalog intervals can be set from 10ms with measurements saved to a PC or internal memory



Datalog menu, interval set to 10ms



SPECIFICATION

		PPA5500			PPA1500/PPA500			
Frequency Range								
		DC,10mHz～2MHz - PPA5500-LC(10Arms), PPA5500(30Arms) DC,10mHz～1MHz - PPA5500-HC(50Arms)			Normal	PPA1500 DC,10mHz～1MHz/ PPA500 DC, 10mHz～500kHz		
					x10	DC,10mHz～100kHz		
Voltage Input								
Internal	Range	300mVpk～3000Vpk(1000Vrms) in 9 ranges (240Vrms within 300Vpk range, using 20% overange)			Normal	1Vpk～2500Vpk(1000Vrms) in 8 ranges		
					x10	100mVpk～300Vpk in 8 ranges		
	Accuracy	0.01% Rdg+0.038% Rng+(0.004%×kHz)+1mV			Normal	0.05% Rdg+0.1% Rng+(0.005%×kHz)+5mV		
					x10	0.05% Rdg+0.1% Rng+(0.01%×kHz)+1mV		
External	Range	300µVpk～3Vpk in 9 ranges【BNC connector 3Vpk max input】			1mVpk～3Vpk in 8 ranges【BNC connector 3Vpk max input】			
	Accuracy	0.01%Rdg+0.038%Rng+(0.004%×kHz)+1µV			0.05%Rdg+0.1%Rng+(0.005%×kHz)+5µV			
Current Input								
Internal		10Arms Low Current (PPA5500-LC) 4mm safety connectors	Ranges	3mApk～30Apk(10Arms) in 9 ranges	20Arms (PPA1500) Shunt 4mm Safety Connectors	Ranges	Normal	100mApk～300Apk(20Arms) in 8 ranges
							x10	10mApk～30Apk in 8 ranges
			Accuracy	0.01% Rdg+0.038% Rng+(0.004%×kHz)+10µA		Accuracy	Normal	0.05% Rdg+0.1% Rng+(0.005%×kHz)+500µA
							x10	0.05% Rdg+0.1% Rng+(0.01%×kHz)+100µA
		30Arms Current (PPA5500) 4mm safety connectors	Ranges	30mApk～300Apk(30Arms) in 9 ranges	30Arms (PPA1500-HC) Shunt 4mm Safety Connectors	Ranges	Normal	300mApk～1000Apk(30Arms) in 8 ranges
							x10	30mApk～100Apk in 8 ranges
			Accuracy	0.01% Rdg+0.038% Rng+(0.004%×kHz)+100µA		Accuracy	Normal	0.05% Rdg+0.1% Rng+(0.005%×kHz)+1mA
							x10	0.05% Rdg+0.1% Rng+(0.01%×kHz)+300µA
		50Arms High Current (PPA5500-HC) ** Touch proof screw terminal	Ranges	100mApk～1000Apk(50Arms) in 9 ranges				
			Accuracy	0.01% Rdg+0.038% Rng+(0.004%×kHz)+300µA				
External input (External shunt Current sensor)		BNC Connector (Max input 3Vpk)	Ranges	300µVpk～3Vpk in 9 ranges	BNC connector (Max input 3Vpk)	Ranges	1mVpk～3Vpk in 8 ranges	
			Accuracy	0.01% Rdg+0.038% Rng+(0.004%×kHz)+1µV		Accuracy	0.05% Rdg+0.1% Rng+(0.005%×kHz)+5µV	
Phase Accuracy								
		0.005deg+(0.01deg×kHz)【PPA5500-LC(10Arms), PPA5500(30Arms)】 0.01deg+(0.02deg×kHz)【PPA5500-HC(50Arms)】			Normal	0.01deg+(0.01deg×kHz)		
					x10	0.01deg+(0.02deg×kHz)		
Power Accuracy								
		[0.03%+0.03%/pf+(0.01%×kHz)/pf] Rdg+0.03%VA Rng			Normal	[0.1%+0.1%/pf+(0.01%×kHz)/pf] Rdg+0.1%VA Rng		
					x10	[0.1%+0.1%/pf+(0.02%×kHz)/pf] Rdg+0.1%VA Rng		
40-400Hz		[0.03%+0.03%/pf+(0.01%×kHz)/pf] Rdg+0.02%VA Rng			40-400Hz	As above with range error reduced from +0.1%V,A,VA Rdg to +0.05%V,A,VA Rng		
General								
Crest Factor		20(Voltage and Current)						
Sample Rate		2.2Ms/s on all channels, No-Gap			1Ms/s on all channels, No-Gap			
IEC Modes		IEC61000 Harmonics and Flicker (PPA5500), IEC62301 Standby Power						
Application Modes		PWM Motor Drive, Ballast, Inrush, Power Transformer, Standby Power, Fluctuating Harmonics, Flicker Meter			Ballast, Inrush, Standby Power			
CMRR - Common Mode Rejection Ratio								
		250V @ 50Hz - ≥ 1mA (150dB)						
		100V @ 100kHz - ≥ 3mA (130dB)						
Measurement Parameters								
		W ,VA ,Var ,pf ,V & A - rms ,rectified mean ,AC ,DC ,Peak ,Surge ,Crest Factor ,Form Factor ,Star to Delta Voltage						
		Frequency (Hz), Phase (deg), Fundamentals, Impedance						
		Harmonics, THD, TIF, THF, TRD, TDD						
		Integrated Values, Datalog, Sum and Neutral values						
Datalog - Up to 4 user selectable measurement functions (30 with optional PC software)								
Datalog Window		No-Gap analysis, Minimum window 10ms						
Memory		10M records into flash RAM (Non-Volatile)			RAM up to 16,000 records			
Communication Ports								
RS232		Baud rate up to 38.4kbps,RTS/CTS flow control						
LAN(Option L)		10/100 Base-T Ethernet auto sensing						
GPIB(Option G)		IEEE488.2 Compatible			—			
USB		USB 2.0 and 1.1 compatible						
Analogue Output		Bipolar ±10V(BNC)			—			
Speed Input		BNC Bipolar±10V or Pulse count 1Hz to 1MHz 0.01% Rdg			—			
Torque		BNC Bipolar±10V or Pulse count 1Hz to 1MHz 0.01% Rdg			—			
Sync		4～6 Phase measurement (Master/Slave)			—			
Extension		4～6 Phase (Master/Slave) + Auxilary			Auxilary Port			
Standard Accessories								
Leads		Power, RS232, USB						
Connection Cables		36A 1.5m long 4mm stackable terminals 1x red, 1x yellow and 2x black per phase (1x red, 1x black with HC version)			20A (Std version) or 30A (HC version) 1.5m long 4mm stackable terminals 1x red, 1x yellow and 2x black per phase			
Connection Clips		4mm terminated aligator clips - 1x red, 1x yellow and 2x black per phase (1x red and 1x black per phase with PPA5500-HC version)						
CD-ROM		CommView2 (RS232/USB/LAN), Command line, Script based communication software						
Documents		User manual, Communications manual, Calibration certificate, Quick start guide						
Mechanical/Environmental								
Display		320×240 dot full colour TFT, White LED Backlit			480×272 dot full colour TFT, White LED Backlit			
Dimensions		130H×400W×315D mm excluding feet			92H×215W×312D mm excluding feet			
Weight		5.4kg(1 Phase), 6kg(3 Phase)			3.3kg(1 Phase), 4kg(3 Phase)			
Safety Isolation		1000Vrms or DC(CATII), 600Vrms or DC(CATIII)						
Power supply		90～265Vrms, 50～60Hz, 40VAmax						
Operating Conditions		5°C to 40°C Ambient Temperature (or air intake temperature when rack mounted), 20-90% Non-Condensing Relative Humidity. Temperature coefficient ±0.01% per °C of reading at 5-8°C and 28-40°C						

MODELS

PPA5500 Series

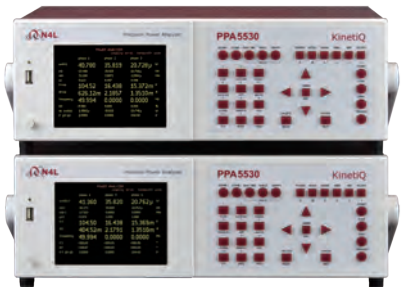
Phases	Model	Specification
1 Ph	PPA5510-LC	DC, 10mHz～2MHz 3mApk～30Apk (10Arms)
2 Ph	PPA5520-LC	
3 Ph	PPA5530-LC	
4 Ph	PPA5540-LC	
5 Ph	PPA5550-LC	
6 Ph	PPA5560-LC	

Phases	Model	Specification
1 Ph	PPA5510	DC, 10mHz～2MHz 30mApk～300Apk (30Arms)
2 Ph	PPA5520	
3 Ph	PPA5530	
4 Ph	PPA5540	
5 Ph	PPA5550	
6 Ph	PPA5560	

Phases	Model	Specification
1 Ph	PPA5510-HC	DC, 10mHz～1MHz 100mApk～1000Apk (50Arms)
2 Ph	PPA5520-HC	
3 Ph	PPA5530-HC	
4 Ph	PPA5540-HC	
5 Ph	PPA5550-HC	
6 Ph	PPA5560-HC	

Touchproof 50A screw connectors used on PPA5500-HC and PPA2600-HC versions

PPA5500 3 Phase model



PPA5500 units in Master/Slave mode, synchronised for 4-6 Phase measurements

PPA1500/PPA500 Series

Phases	Model	Specification
1 Ph	PPA1510/510*	DC, 10mHz～1MHz 100mApk～300Apk (20Arms)
2 Ph	PPA1520/520*	
3 Ph	PPA1530/530*	
1 Ph	PPA1510/510-HC*	DC, 10mHz～1MHz 300mApk～1000Apk (30Arms)
2 Ph	PPA1520/520-HC*	
3 Ph	PPA1530/530-HC*	

*PPA500 DC, 10mHz～500kHz

PPA1500 3 Phase model

Accessories

Leads and Interfacing	
Type	Specification
36A Connection lead set	1.5 Meter - 36A lead set with 4mm stackable safety terminals 1x Red, 1x Yellow and 2x Black per phase plus alligator clips
36A 4mm to spade (option)	1.5 Meter - 36A lead set with 4mm to spade for HC terminals
RS232 cable	RS232 9pin serial Cable
USB cable	USB 2 Meter A male to B male
USB to 9-pin RS232 (Option)	USB～9-pin RS232 Serial Converter
Master-Slave cable (Option)	Leads for connecting 2x PPA5500 in master/slave mode

Interface (Optional)	
Type	Specification
PPA-LAN interface	Option L - LAN Interface
PPA-GPIB interface	Option G - GPIB(IEEE488)Interface - PPA25/26 and 55 series

PC Software (Optional)	
Type	Specification
PPA Dual Data Logger	PC control and data acquisition of 1 to 6 phases with selectable Real Time data, Graphing, Datalog and versatile export options
PPAcomm	Basic PC Control, Data storage, Print features
PPA Standby Power	Standby power measurements and reporting to IEC62301
PPAsoft PC software	LabView based software, PC Control, Data storage and Print

Connection and extension port accessories (Optional)	
Type	Specification
Breakout box	Simple analyzer connection between source and DUT
PCIS	10Arms 300Apk rated Phase Controlled Inrush Switch

Rack Mount Kit (Optional)	
Type	Specification
Rack Mount brackets	PPA26/5500 19in rack mount brackets (model specific)
Rack Mount panel	PPA2500 19in rack facia panel

Carry cases (Optional)	
Type	Specification
Soft carrying case	Black nylon with shoulder strap
Hard flight case	Hard case with moulded lining suitable for shipping

Documents (Standard)	
Type	Specification
Calibration/Test & Inspection certificate	PPA Certificate of calibration
Spare set of manuals	User manual Comms manual

PRODUCT COMPARISON

	PPA1500/PPA500	PPA2500/PPA2600	PPA5500
Basic Accuracy			
V, A rdg error	0.05%	0.04%	0.01%
Power rdg error	0.10%	0.05%	0.03%
Phase			
Internal	1～3		
Master/Slave operation	—	4～6	
Voltage Input			
Max input voltage	2500Vpk	3000Vpk	
No. of ranges	8	8	9
Direct Current Input			
10Arms model	—	○	○
20Arms model	○	—	—
30Arms model	○	○	○
50Arms model	—	only PPA2600	○
No. of ranges	8	8	9

	PPA1500/PPA500	PPA2500/PPA2600	PPA5500
Frequency Band			
20A & 30A Shunt	DC～1MHz/500kHz	—	—
10A & 30A Shunt	—	DC～2MHz	DC～2MHz
50A Shunt	—	DC～1MHz	DC～1MHz
Features			
USB Memory port	○	—	○
Real time clock	○	—	○
19in Rack mount option	—	only PPA2600	○
Other features			
Speed-Harmonics/sec	300	300	1,800
Non-volatile memory	192kB	192kB	1GB
Internal data logging	4	4	16(4 X 4)
Torque and speed Input	—	○	○
Dimensions - Excl. Feet H x W x D (mm)	92 x 215 x 312	125 x 355 x 250 125 x 430 x 250	130 x 400 x 315
Weight	3.3 - 4kg	5 - 6kg	5.4 - 6kg

Accessories

External Shunt Resistor (DC ~ 1MHz)				
Model number	Basic accuracy	Phase accuracy	Maximum current	
			Continuous	Peak
HF500	0.2mΩ (±0.1%)	0.1° / kHz	500Arms	5000Apk
HF200	0.5mΩ (±0.1%)	0.1° / kHz	200Arms	2000Apk
HF100	1.0mΩ (±0.1%)	0.05° / kHz	100Arms	1000Apk
HF020	10mΩ (±0.1%)	0.01° / kHz	20Arms	200Apk
HF006	100mΩ (±0.1%)	0.001° / kHz	6Arms	60Apk
HF003	470mΩ (±0.1%)	0.0001° / kHz	3Arms	30Apk

External Shunt HF-003

External Shunt HF-500

Probe/Clamp Current Transformer: AC				
Model number	Measuring range	Frequency range	Clamp diameter	Category
M3 UB 50A-1V	100mA ~ 50A	40Hz ~ 5kHz	15mm×17mm	600V CATIII
M3 U 100A-1V	1A ~ 100A	40Hz ~ 5kHz	15mm×17mm	600V CATIII
S UE 200A-1V	1A ~ 200A	40Hz ~ 5kHz	50mm ø	600V CATIII
S UE 250 500 1000-1V	1A ~ 250A/500A/1000A	40Hz ~ 5kHz	50mm ø	600V CATIII
UE UE 1000A-1V	1A ~ 1000A	40Hz ~ 5kHz	43mm ø	600V CATIII
SM UE 1000A-1V	0.5A ~ 1000A(1%>100A)	15Hz ~ 15kHz	54mm ø	600V CATIII
SM UB 1000A-1V	0.5A ~ 1000A(0.5%>10A)	15Hz ~ 15kHz	54mm ø	600V CATIII
P32 UE 1000A-1V	5A ~ 1000A	40Hz ~ 5kHz	83mm ø (125mm×47mm or 100m m×58mm)	600V CATIII
P32 UE 3000A-1V	5A ~ 1000A	40Hz ~ 5kHz	83mm ø	600V CATIII

Current Clamp SC 3C 1000A-1V

Current Clamp P20 3C 2000A-2V

Rogowski Coil : AC				
Model number	Measuring range	Frequency range	Coil Circumference	Category
WR5000 Rogowski	1A ~ 5000A	1Hz ~ 1MHz	600mm	600V CATIII

Probe / Current Clamp (Hall effect): AC + DC				
Model number	Measuring range	Frequency range	Clamp diameter	Category
SC 3C 1000A-1V	1A ~ 1000A	DC ~ 2kHz	59mm ø	600V CATIII
P20 3C 2000A-2V	40A ~ 1000/2000A	DC ~ 2kHz	83mm ø	600V CATIII
P40 3C 4000A-2V	40A ~ 2000/4000A	DC ~ 2kHz	83mm ø	600V CATIII
P50 3C 5000A-2V	50A ~ 1000/5000A	DC ~ 2kHz	83mm ø	600V CATIII

HV Probe TT-HV15

High Performance Probes			
Model	Voltage range	Frequency range	Specification
ULC Probe	~ 1000Vrms	DC ~ 2MHz	Ultra-low capacitance probe, 1000: 1, 1.5pF
ATT20 probes	—	—	20:1 HV Attenuator
ATT10 probes	—	—	10:1 HV Attenuator

All specifications at 23°C ± 5°C . These specifications are quoted in good faith but Newtons4th Ltd reserves the right to amend any specification at any time without notice

The N4L product range includes Frequency Response and Impedance Analyzers, Selective Level Meters and Laboratory Power Amplifiers

Phase Sensitive Multimeters

PSM1735
10µHz ~ 35MHz

PSM1700
10µHz ~ 1MHz

Applications

- Power supply phase margin and gain margin (FRA)
- Inductance, Capacitance and Resistance (LCR)
- Analysis of mechanical vibration (HARM)
- Phase Angle Voltmeter (PAV)

Contact your local N4L Distributor for further details

Newtons4th

Newtons4th Ltd (abbreviated to N4L) was established in 1997 to design, manufacture and support innovative electronic equipment to a world-wide market, specialising in sophisticated test equipment particularly related to phase measurement. The company was founded on the principle of using the latest technology and sophisticated analysis techniques in order to provide our customers with accurate, easy to use instruments at a lower price than has been traditionally associated with these types of measurements

Flexibility in our products and an attitude to providing the solutions that our customers really want has allowed us to develop many innovative functions in our ever increasing product range

Newtons4th Ltd are ISO9001 registered, the internationally recognised standard for the quality management of businesses

In recognition of the technical innovation and commercial success of the PPA series, N4L received the "Innovation 2010" Queen's award for enterprise

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